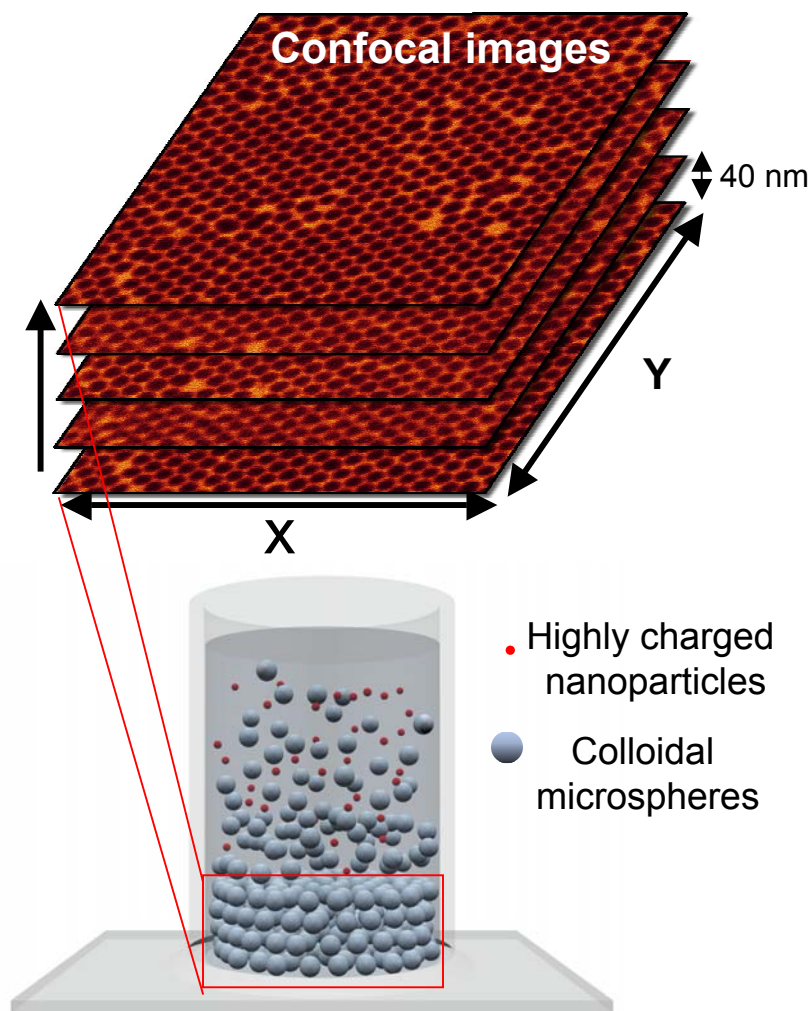


Novel Colloidal Routes to Photonic Band Gap (PBG) Materials

J. Lewis (PI), NSF Grant # DMR 0071645

Project Description

Colloidal assembly routes are pervasive influencing technologies ranging from advanced materials processing, coatings, novel inks, paints, pharmaceuticals, and even food processing. A key objective in each application is to control the forces between colloidal particles to achieve the desired phase behavior, rheological properties, and structure. Here, we demonstrate a new route for creating 3-D periodic colloidal crystals based on nanoparticle-mediated, epitaxial assembly. Using highly charged nanoparticles, we have regulated the phase behavior of binary colloid-nanoparticle mixtures to facilitate the assembly of ordered structures on both flat (see images) and epitaxially patterned substrates (not shown). Such structures serve as templates for photonic band gap materials.



Directed Colloidal Assembly of Mesoscale Periodic Composites

NSF Grant # DMI 0099360

Research Aim:

- ◆ To develop concentrated colloidal inks for direct-write assembly of 3-D periodic structures

